

Graphing Parabolas

December 8, 2009

Objectives

- Review the vertex and axis of symmetry
- Graph a parabola

Find the axis of symmetry and the vertex of each

- $y = x^2 + 10x - 5$

$$x = -10/2 = -5$$

$$y = (-5)^2 + 10(-5) - 5$$
$$= 25 - 50 - 5 = -30$$

vertex $(-5, -30)$

Find the axis of symmetry and the vertex of each

$$y = -2x^2 + 12x - 3$$

$$x = -12/2(-2) = -12/-4 = 3$$

$$y = -2(3)^2 + 12(3) - 3$$
$$= -2(9) + 36 - 3$$
$$= -18 + 36 - 3 = 15$$

vertex $(3, 15)$

Graphing parabolas

- Find the axis of symmetry ($x = -b/2a$)
- Find the vertex ($-b/2a$, plug in x value to find y)
- Find two symmetric points (symmetric points are x coordinates equally distant from the axis of symmetry)
- Use the one of the symmetric points to find the y coordinate of both points.
- Graph the x and y coordinates for the symmetric points.
- Draw a smooth curve.

Find vertex

example

$$-2x^2 + 12x + 3$$

$$-2(0)^2 + 12(0) + 3 = 3$$

$x = 0, 6$

$(0, 3)$ $(6, 3)$

$(3, 5)$

Try graphing these

$$y = x^2 - 10x + 16$$

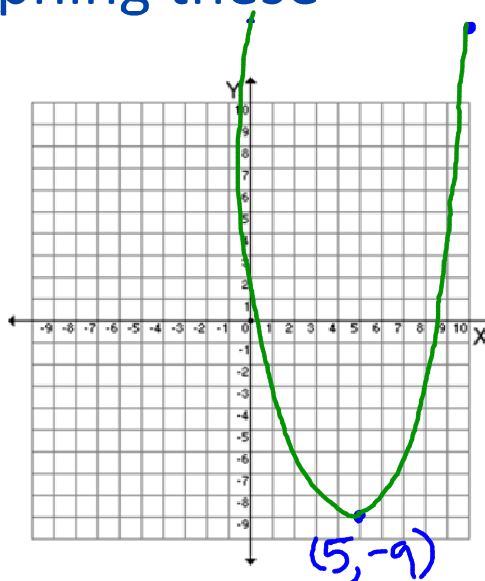
$$x = 10/2 = 5$$

$$y = (5)^2 - 10(5) + 16$$

$$25 - 50 + 16 = -9$$

Sympts $x = 0, 10$

$$y = 0^2 - 10(0) + 16 = 16$$



Try graphing these

$$y = 2x^2 + 6x + 6$$

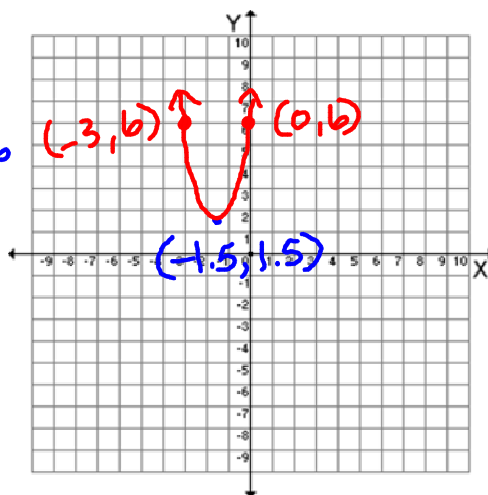
$$x = -b/4 = -1.5$$

$$\begin{aligned} y &= 2(-1.5)^2 + 6(-1.5) + 6 \\ &= 2(2.25) - 9 + 6 \\ &= 4.5 - 9 + 6 = 1.5 \end{aligned}$$

$$x = 0, -3$$

$$\begin{aligned} y &= 2(0^2) + 6(0) + 6 \\ &= 6 \end{aligned}$$

$$(0, 6) \quad (-3, 6)$$



Try graphing these

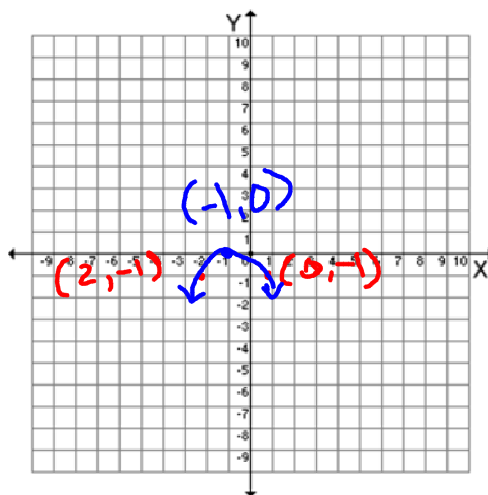
$$y = -x^2 - 2x - 1$$

$$x = -b/2(-1) = -1$$

$$\begin{aligned} y &= -(-1)^2 - 2(-1) - 1 \\ &= -1 + 2 - 1 \\ &= 0 \end{aligned}$$

$$x = 0, -2$$

$$\begin{aligned} y &= -0^2 - 2(0) - 1 \\ y &= -1 \end{aligned}$$



$$y = 3x^2$$

$$x = 0/2(3) = 0$$

$$y = 3(0)^2 = 0$$

$$x = -1, 1$$

$$y = 3(1^2) = 3$$

$$(-1, 3) \quad (1, 3)$$

